

PATENT SPECIFICATION

435,041

Convention Date (Germany): March 11, 1933.

Application Date (in United Kingdom): March 12, 1934. No. 7794 / 34.

Complete Specification Accepted: Sept. 12, 1935.



COMPLETE SPECIFICATION.

Improved Method of Effecting Adhesion or Cementing of the Surfaces of Materials.

We, I. G. FARBENINDUSTRIE AKTIEN-GESELLSCHAFT, a joint stock company organised under the laws of Germany, of Frankfort-on-Main, Germany, do hereby
 5 declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

10 This invention relates to an improved method of effecting adhesion or cementing of the surfaces of materials of all kinds. The method can be employed for uniting surfaces of pasteboard, vul-
 15 canised fibre, textiles and in particular wood.

It is already known to glue or cement together wood, in particular ply-wood and furniture wood by employing aqueous
 20 solutions of condensation products of urea, thiourea or derivatives thereof and aldehydes of polymers thereof, and also hardening agents, such as acids, acid salts or substances which split off acids.
 25 In these known processes a mixture of the condensation product and the hardening agent is applied to the surfaces to be cemented. When a hardening agent which acts comparatively slowly is used
 30 the adhesion requires a correspondingly long setting period. If, however, a mixture of a quickly acting hardener with the adhesive is resorted to, the mixture sets prematurely and, for example, when
 35 employing the mixture for cementing large surfaces the portion first applied hardens before the whole surface to be cemented is covered.

40 In accordance with the present invention the above mentioned disadvantages are avoided. The method of this invention includes the operation of applying separately to the surfaces to be cemented together or to one of them as an adhesive
 45 a condensation product of urea or thiourea with an aldehyde and a hardener for this condensation product.

Among the compounds suitable as hardening agents for the aldehyde urea condensation products may be men-
 50 tioned acids, such as hydrochloric acid, sulphuric acid, phosphoric acid and acetic acid, oxalic acid, lactic

[Price 1s.]

acid, acid salts, such as acid sodium sul-
 55 phate, mono ammonium phosphate and aluminium chloride and substances splitting off acids when incorporated in the adhesive mixture, such as ammonium chloride and ammonium sulphate.
 60 Further additions, such as for example starch, potato flour, ground potato flakes or fillers of the most varied kinds can be incorporated with the adhesives.

In order to carry out the cementing process of this invention a hardening agent, preferably in a viscous state, (to prevent
 65 penetration to any marked extent into a material to be cemented) is with advantage applied as a thin layer, then the aldehyde urea condensation product pre-
 70 ferably in aqueous solution is brushed on and the materials to be cemented are finally pressed together. When cementing materials where a penetration of the
 75 adhesive should be avoided, for example when inlaying precious woods, it suffices to apply the hardening agent, as also the adhesive, to one side only of the surfaces to be cemented. In the case of thicker
 80 working materials, in which a penetration has no disadvantageous influence, the hardening agent and adhesive can be applied to both surfaces to be cemented.

The separate application of adhesive and hardening agent can likewise be
 85 carried out in such a manner that the adhesive is applied first and the adhesive layer is then coated with a mobile solution of the hardening agent, for example
 90 by spraying.

The invention is illustrated by the following example:—

EXAMPLE.

A solution of 20 parts by weight of ammonium chloride in 80 parts of water, advantageously with the addition of a
 95 thickening agent, such as for example hydrolysed starch, is applied in the thinnest possible layer to both sides of a middle layer of pine wood. A solution
 100 of a formaldehyde urea condensation product is then applied, produced as follows:—

200 parts by weight of a 30% aqueous solution of formaldehyde are heated to
 105 95° C., with 0.1 part by weight of mono

Price 4s 6d.

Price 3s. 6d.

sodium phosphate. A solution of 60 parts by weight of urea in 30 parts of water heated to 70° C. is added to the above solution. After the addition of 5 0.15 part by weight of trisodium phosphate the solution is evaporated in vacuo at a temperature below 50° C. until a 35% solution of the condensation product is obtained.

10 Immediately after applying the two solutions two binding layers of veneer are laid on and then pressure is applied for 1½ hours at the ordinary temperature. The resulting cemented material possesses 15 a stability not attainable with other cold acting glues or cements.

The hardening solution, which is ammonium chloride in the present example, can equally well be applied to 20 the middle layer of pine wood as also the covering layers of veneer, if desired also to all the surfaces to be cemented. This applies also to the use of the formaldehyde urea condensation product.

25 The process can likewise be carried out in such a manner that the formaldehyde urea condensation product is first applied to the surfaces to be cemented and then the ammonium chloride solution is introduced, advantageously by spraying. 30

The joining together of the surfaces to be cemented as treated above can also be accomplished in the known manner at a raised temperature for example 35 within a temperature range up to about 150° C.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to

be performed, we declare that what we claim is:— 40

1. In a process for effecting adhesion the method consisting in applying separately to the surfaces to be cemented together, or to one of them, an aldehyde urea condensation product, in particular 45 a formaldehyde urea condensation product and a substance exerting a hardening influence thereon.

2. Process as claimed in claim 1 in which acids, acid salts or substances 50 which after incorporation with the adhesive mixture yield acids are employed as hardening agents.

3. Process as claimed in any of the preceding claims in which filling 55 materials are caused to be incorporated in the adhesive layer.

4. Process as claimed in any of claims 1—3, in which the hardening agent is first applied and then the aldehyde urea condensation product applied on the 60 hardening agent.

5. Process as claimed in any of claims 1—3 in which the aldehyde urea condensation product is first applied and then a solution of the hardening agent applied 65 thereon, for example by spraying.

6. Process as claimed in any of the preceding claims, in which the cementing 70 is accomplished at room temperature.

7. Process for effecting adhesion substantially as described in the example.

Dated the 10th day of March, 1934.

CARPMAELS & RANSFORD,

Agents for Applicants,

24, Southampton Buildings, London, W.C.2.